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CLAIMS

1. A device for guiding light consisting of at least one partially translucent surface material, with

   - a surface upper side, which has optically active surface structures for guiding and/or scattering light, as well as an optically switchable coating provided at least in partial areas of the surface structures, or
   - at least two directly or indirectly opposing surface upper sides, of which one exhibits optically active surface structures for guiding and/or scattering light, and the other provides an optically switchable coating that covers at least parts of the surface upper side.

2. The device according to claim 1, characterized in that the optically active surface structures at least in partial areas provide microstructure surfaces that are covered at least in part by an optically switchable layer, which uses near-field effects triggered by the microstructures and based on diffraction and interference effects for their optical effect.

3. The device according to claim 1, characterized in that the optically active surface structures are designed as microstructures.

4. The device for guiding light consisting of at least one partially translucent surface material, with

   - a surface upper side, which has optically active surface structures for guiding and/or scattering light, which at least in partial areas provide microstructure surfaces that are covered at least in part by an optically active layer, and use near-field effects triggered by the

microstructures and based on diffraction and interference effects for their optical effect, or

- a surface upper side, which has a microstructure surface for guiding and/or scattering light, which is covered at least in part by an optically active layer, and uses near-field effects triggered by the microstructures for their optical effect.

5. The device according to one of claims 2 to 4, characterized in that the microstructures exhibit average structural periods of less than 100 μm in size, preferably less than 20 μm, and an aspect ratio, i.e., ratio of structural height to structural period, of greater than 0.2.

6. The device according claim 4 or 5, characterized in that the optically active layer is applied exclusively to areas on the microstructure surface where excessively higher or lower near field intensities arise on the microstructure surface, i.e., intensity maximums and minimums generated on the microstructure surface owing to diffraction and interference effects, at specific angles of incidence for light relative to the surface upper side

7. The device according to one of claims 4 to 6, characterized in that the optically active layer has absorption, transmission and/or reflection behavior is independent of time.

8. The device according to one of claims 4 to 6, characterized in that the optically active layer is an optically switchable layer.

9. The device according to one of claims 1 to 3 or 8, characterized in that the optically switchable layer is selectively applied to specific areas of the surface structure.

10. The device according to one of claims 1 to 3, 8 or 9, characterized in that the optically switchable layer is thinner than 10 μm, preferably thinner than 1 μm.

11. The device according to one of claims 1 to 3 or 8 to 10, characterized in that the optically switchable layer exhibits gasochromic, electrochromic, photochromic, photoelectrochromic or thermochromic layer material.

12. The device according to one of claims 1 to 3 or 8 to 10, characterized in that the switching function of the optically switchable layer can be actuated.

13. The device according to claim 12, characterized in that the optically switchable layer exhibits a gasochromic, electrochromic or photoelectrochromic layer material.

14. The device according claim 11 or 13, characterized in that the gasochromic layer material is selected from the following material classes:

- transitional metal oxides, e.g., tungsten oxide, tungstates, nioboxide, molybdenum oxide, molybdates, nickel oxide, titanium oxide, vanadium oxide, iridium oxide, manganese oxide, cobalt oxide or mixtures thereof,
- metal hydrides, e.g., $La_{1-z}Mg_zH_x$, $Y_{1-z}Mg_zH_x$, $Gd_{1-z}Mg_zH_x$, Yh_b, LaH_b, SmH_b, $NiMg_2H_x$, $CoMg_2H_x$ or mixtures thereof, with z values in the 0 to 1 range, x values in the 0 to 5 range, and b values from 0 to 3, or
- switchable polymers, such as polyviologens, polythiophenes or polyanilines, or Prussian Blue.

15. The device according to claim 14, characterized in that the layer material consists of

- transitional metal oxides having a layer thickness ranging from 100 nm to 1000 nm, preferably 200 nm to 600 nm, or
- metal hydrides with a layer thickness ranging from 10 nm to 500 nm, preferably 20 nm to 50 nm.

16. The device according to one of claims 11 or 13 to 15, characterized in that the gasochromic layer material is actively connected with catalytic material.

17. The device according to claim 16, characterized in that the catalytic material is designed as a type of layer, and contains platinum, palladium, rhodium, osmium, rhenium, nickel, ruthenium or mixtures thereof.

18. The device according to claim 17, characterized in that the catalytic layer has a layer thickness of less than 10 nm, preferably less than 3 nm.

19. The device according to one of claims 1 to 3 as well as 8, characterized in that the optically switchable layer exhibits phototropic or thermotropic layer material.

20. The device according to claim 19, characterized in that the optically switchable layer is applied at least to partial areas of a surface upper side, and spaced indirectly or directly apart from the surface upper side provided with optically active surface structures for guiding and/or scattering light.

21. The device according to claim 20, characterized in that the optically switchable layer is incorporated between two surface elements transparent to sunlight.

22. The device according to one of claims 19 to 21, characterized in that the thermotropic layer material is diffusely scattering when cold, and largely transparent when warm.

23. The device according to claim 22, characterized in that the thermotropic layer material contains paraffins or latent storage material, such as salt solutions.

24. The device according to one of claims 11 to 13, characterized in that the electrochromic layer material can be selected from the material classes:

- transitional metal oxides, e.g., tungsten oxide, tungstates, nioboxide, molybdenum oxide, molybdates, nickel oxide, titanium oxide, vanadium oxide, iridium oxide, manganese oxide, cobalt oxide or mixtures thereof,
- metal hydrides, e.g., $La_{1-z}Mg_zH_x$, $Y_{1-z}Mg_zH_x$, $Gd_{1-z}Mg_zH_x$, Yh_b, LaH_b, SmH_b, $NiMg_2H_x$, $CoMg_2H_x$ or mixtures thereof, with z values in the 0 to 1 range, x values in the 0 to 5 range, and b values from 0 to 3, or
- switchable polymers, such as polyviologens, polythiophenes or polyanilines, or Prussian Blue.

25. The device according to one of claims 1, 2, 4 to 24, characterized in that the optically active surface structures are given macroscopic geometries rising vertically to the surface upper side of the surface material or take the form of cuts or recesses in the surface material, and exhibit interfaces at which light is refracted or diffracted according to the laws of geometric optics.

26. The device according to one of claims 1 to 25, characterized in that at least partially translucent surface material consists of at least one carrier substrate transparent to sunlight resembling a massive pane.

27. The device according to one of claims 1 to 26, characterized in that the partially translucent surface material is a window element, preferably for buildings, or part of a window element.

28. The device according to one of claims 1 to 27, characterized in that the partially translucent surface material takes the form of a single carrier substrate transparent to sunlight, with the optically active surface structures and the optically switchable layer or the microstructure surfaces optically active in the near field range with the optically active layer on a respective shared surface upper side or on respective different surface upper sides.

29. The device according to one of claims 1 to 27, characterized in that two carrier substrates transparent to sunlight are provided, whose surface upper sides are spaced apart opposite each other, that the optically active surface structures on one of the two opposing surface upper sides and the optically switchable layer or the microstructure surfaces optically active in the near field on the opposing surface upper side are provided with the optically active layer.

30. The device according to claim 29, characterized in that the two carrier substrates transparent to sunlight are designed as windowpanes of a dual glazing, whose opposing surface upper sides incorporate that intermediate space of the panes.

31. The device according to one of claims 1 to 25, characterized in that the at least partially translucent surface material is designed as a kind of film.

32. The device according to claim 21, characterized in that the film is attached to a carrier substrate transparent to sunlight.

33. The device according to one of claims 1 to 32, characterized in that the optically active surface structures are geometrically uniform and, based on the presumption of a prescribed periodic sequence, are formed and arranged on the surface upper side, and that the optically switchable layer is applied to all surface structures over their entire surface, or only selectively to specific partial areas of the surface structures.

34. The device according to claim 33, characterized in that an optically non-switchable layer with absorption, transmission and/or reflection properties not dependent on time is selectively applied in other areas of the surface structures in combination with an optically switchable layer selectively applied in specific partial areas of the surface structures.

35. The device according to one of claims 1 to 34, characterized in that the surface structures exhibit corners or edges that are locally coated with an optically switchable or optically active layer with absorption, transmission and/or reflection properties not dependent on time.